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101700-21-L
1 April 1975

Study of Atmospheric Effects in SKYLAB Data
Eighth Quarterly Progress Report

EREP Investigation 410 M
NASA Contract NAS9-13272

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Eighth Quarterly Progress Report

This report covers progress during the eighth quarter (1 December 1974 - 28 February 1975) of contract NAS9-13272, "Study of Atmospheric Effects in SKYLAB Data," EREP No. 410 M. The work is being conducted in the Infrared and Optics Division of the Environmental Research Institute of Michigan, under the general supervision of Mr. R. R. Legault. The principal investigator is Mr. F. J. Thomson.

PROGRESS

Aircraft data processing has continued to the point where a set of calibration coefficients relating digital tape counts to reflectance have been obtained for the 10,000 ft data collected over the Williamston test site by the ERIM M-7 multispectral scanner. When digital count signatures are extracted from the data, the calibration coefficients can be applied to the signature data to obtain reflectance signatures. At the close of this quarterly period, the 10,000 ft scanner data had been smoothed to simulate the 80m resolution of the S-192 sensor, but the signatures had not yet been extracted.

A set of atmospheric visibility and base elevation cases were defined for exercise of the Turner model. Tables 1 and 2 show those cases. Two experiments are planned--one to vary the atmospheric visibility at constant base elevation and the other to vary the base elevation for two atmospheric variabilities. Subcase 1 is a typical eastern U.S. case, while subcase 2 is typical of Western U.S. While there may be some objection to computing effects of base elevation changes on agriculture recognition for the western U.S. case (with base elevations of up to 12,000 ft), we feel that the exercise will provide some guidance about the magnitude of the effects for more typical forestry or land use recognition problems appropriate to that part of the country.

SKYLAB S-192 tapes and imagery have been received, but little processing has been done on these data yet. That processing is planned for later in the performance period.

TABLE 1

ATMOSPHERIC STATES TO BE CONSIDERED
FOR TURNER MODEL CALCULATIONS
(EXPRESSED AS HORIZONTAL VISIBILITY)

Case	Horizontal Visibility (km)
1	3 km
2	6 km
3	10 km
4	20 km
5	40 km
6	160 km

Base elevation - sea level

TABLE 2

BASE ELEVATION CONDITIONS FOR TURNER MODEL CALCULATIONS

CASE 1 - 10 km horizontal visibility

Sub Case	Base Elevation (ft)
A	0*
B	2000
C	4000
D	6000
E	8000

CASE 2 - 40 km horizontal visibility

Sub Case	Base Elevation (ft)
A	0*
B	6000
C	8000
D	10000
E	12000

*represents cases shown in Table 1

S-192 data for Cripple Creek were received. The S-192 data on tape were converted to ERIM format and a graymap of the 2.05 - 2.35 μm data was sent to Dr. Harry Smedes for location of training sets. The 2.05 - 2.35 μm channel was mapped because it had the largest dynamic range and appeared most noise free on the imagery provided. By examination of the imagery of all bands supplied, the process of selecting a band to map was greatly facilitated. Also, a normally tedious process of data quality assessment was materially shortened.

PLANS

Aircraft processing will continue, with the goal of getting reflectance signatures to be reached during the next quarter. Turner model calculations will be completed, and the recognition model exercised. S-192 data from Michigan will be processed.

Processing of Cripple Creek data for Harry Smedes will continue as soon as we receive training set locations from him.

In preparation for ERIM's move to new facilities in about June, the computer operation is being scheduled for move. We are working closely with the computer group to assure minimum (but not zero) impact to the project schedule caused by 7094 and 1401 computer down time for move.

TRAVEL

None

Respectfully submitted:

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